

**METHOD AND SYSTEM FOR
CONTROLLING IN-SITU ROTATION MODE
OF FOUR-WHEEL INDEPENDENT
STEERING TYPE VEHICLE**

**CROSS-REFERENCE TO RELATED
APPLICATIONS**

[0001] This application claims the benefit of Korean Patent Application No. 10-2020-0140561, filed on Oct. 27, 2020, which application is hereby incorporated herein by reference.

TECHNICAL FIELD

[0002] The present disclosure relates to a method and a system for controlling an in-situ rotation mode of a four-wheel independent steering type vehicle.

BACKGROUND

[0003] Since conventional vehicles steer wheels only in two modes (driving straight and left/right turning), the conventional vehicles can be intuitively driven using only a small number of operating systems. On the other hand, four-wheel independent steering (4WS) systems can independently control each wheel to implement various vehicle behaviors.

[0004] To describe with reference to FIGS. 1A and 1B, in a general front wheel driving mode and a general rear wheel driving mode, wheels are rotated as much as a steering wheel is rotated, and acceleration is achieved as much as an accelerator pedal is stepped on so that the vehicle can rotate while traveling forward. In this case, since whether to steer rear-wheels in reverse phase with respect to front wheels can be determined on the basis of a vehicle speed or a steering angle, it may help to reduce a turning radius during a U-turn.

[0005] In addition, in a diagonal movement mode as shown in FIG. 1C, the rear wheels are controlled in phase with respect to the front wheels so that yawing does not occur in the vehicle. This has an advantage when the vehicle changes a lane or passes a forward vehicle.

[0006] In addition, in a parallel movement mode as shown in FIG. 1D, a 90° rotation of each of the front and rear wheels is possible so that it is advantageous for parallel parking.

[0007] In addition, in an in-situ rotation mode as shown in FIG. 1E, a 450 rotation of each of the front and rear wheels is possible so that the vehicle can perform a U-turn in an alleyway.

[0008] Meanwhile, the in-situ rotation mode is one of the most unusual driving modes of the 4WS system together with the parallel movement mode. Since the in-situ rotation mode is an unusual driving mode, the in-situ rotation mode can be differentiated from the existing vehicles and appeal to customers but has the following problems.

[0009] First, the in-situ rotation mode is a mode in which only the yawing behavior of the vehicle occurs, and the yawing behavior of the vehicle is not familiar to a driver so that the driver may feel discomfort of such a vehicle behavior.

[0010] Second, in the in-situ rotation mode, a vehicle movement direction does not coincide with a direction of a field of view of a driver. Thus, since the driver should turn the whole body to secure a field of view and drive in a state

of anxiety about when to stop a turning, there are a problem of difficulty in a driving operation and a problem of an accident risk.

[0011] The foregoing is intended merely to aid in the understanding of the background of the present disclosure, and is not intended to mean that the present disclosure falls within the purview of the related art that is already known to those skilled in the art.

SUMMARY

[0012] The present disclosure relates to a method and a system for controlling an in-situ rotation mode of a four-wheel independent steering type vehicle. Particular embodiments relate to a method and a system for controlling an in-situ rotation mode of a four-wheel independent steering type vehicle, which allow an in-situ rotation behavior of the vehicle to be operated easily and simply to reduce driving anxiety and an accident risk.

[0013] Accordingly, embodiments of the present disclosure have been made keeping in mind problems occurring in the related art, and embodiments of the present disclosure provide a method and a system for controlling an in-situ rotation mode of a four-wheel independent steering type vehicle, which allow an in-situ rotation behavior of the vehicle to be operated easily and simply to reduce driving anxiety and an accident risk.

[0014] According to one embodiment, there is provided a control method including when an in-situ rotation mode of a vehicle is executed, a wheel rotation operation for steering and rotating, by a controller, a wheel according to the in-situ rotation mode, when a steering wheel is steered, a target rotation angle calculation operation for calculating, by the controller, a target rotation angle of the vehicle on the basis of a steering angle of the steering wheel, and when a step-in signal of an accelerator pedal is applied, a rotation control operation for controlling, by the controller, the vehicle to be rotated in-situ by as much as the target rotation angle.

[0015] In the target rotation angle calculation operation, the target rotation angle may be divided for each step according to a steering angle range of the steering wheel, and the target rotation angle may be set for each step.

[0016] The steering angle range may be set by continuously connecting predetermined angle ranges.

[0017] The target rotation angle calculation operation may be performed by an operation of a separately provided mechanism.

[0018] In the target rotation angle calculation operation, a separate step rotation mode button may be provided on a side surface of a gear shift lever, and the target rotation angle may be calculated when the step rotation mode button is operated.

[0019] In the target rotation angle calculation operation, when a specific button among gear shift buttons is pressed a predetermined number of times or more or for a predetermined period of time or more, the target rotation angle may be calculated.

[0020] In the target rotation angle calculation operation, the target rotation angle may be continuously changed and set to correspond to the steering angle of the steering wheel.

[0021] In the rotation control operation, when the vehicle is rotated in-situ, the steering wheel may be rotated in a direction opposite to a rotation direction of the vehicle by as much as an angle at which the vehicle is rotated.